

REMARKS

Reconsideration and allowance of this application are respectfully requested in light of the above amendments and the following remarks.

Claims 32-49 have been cancelled without prejudice or disclaimer, and claims 50-60 have been newly added. Support for the amendments to the claims can be found, for example, at paragraphs [0152], [0153] and [0163], and FIGs. 7 and 16 of the instant application. No new matter is entered. (It should be noted that references herein to the specification and drawings are for illustrative purposes only and are not intended to limit the scope of the invention to any particular aspect of the referenced embodiments.)

In the Office Action, claims 32 and 41 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Furthermore, claims 32 to 49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Haartsen (U.S. Publication No. 2002-0126692) (hereinafter, “Haartsen”) in view of Montano (US Patent No. 7,280,518) (hereinafter, “Montano”), Chuah (U.S. Publication No. 2003-0035434, patented as U.S. Patent No. 7,154,877) (hereinafter, “Chuah”), and Le et al. (U.S. Publication No. 2003-0035434) (hereinafter, “Le”). To the extent these rejections may be deemed applicable to the new claims presented herein, the Applicants respectfully traverse as follows.

With respect to the rejections of claims 32 and 41 under 35 U.S.C. § 112, first paragraph, the Office Action states:

“First according to the original specification on file, it is not clearly described and/or mentioned that “**in the contention step**, the given radio communication device divides **the overlapped time slot** into a plurality of time slots.” Accordingly to FIG. 7 which describes the contention resolution step, did not clearly describe and/or mention any step of “**the given radio communication device divides the overlapped time slot into a plurality of time slots** (emphasis in original).”

Claims 32-49 have been cancelled. New claim 50 recites the feature of “a time slot dividing section that divides the time slot into a plurality of slots.” It is respectfully submitted that support is provided for this recited feature at, for example, paragraphs [0152], [0153] and [0163], [0193], and FIGs. 7 and 16 of the published application. More specifically, it is clearly disclosed in paragraphs [0152] and [0153] that, in the case of a lack of consecutive free space in contention resolution processing, “the value of the SHARE_MODE parameter is increased to an appropriate value to shorten the time slot so that the best SHARE_SLOT will be selected under the circumstances.” In other words, as the value of the SHARE_MODE parameters is increased, the number of time slots is increased (by dividing up the time slot), and the length of each time slot is correspondingly decreased. Furthermore, paragraph [0193] discloses: “[t]he above-mentioned procedure enables the ICH to increase the SHARE_MODE parameter value when a contention occurs, and divide time defined by the SHARE_PERIOD parameter into finer time slots (emphasis added).”

Accordingly, it is respectfully submitted that the original application provides support for the newly recited feature of “a time slot dividing section that divides the time slot into a plurality of slots.”

With respect to the rejections of claims 32-49 under 35 U.S.C. § 103(a), it is respectfully submitted that the applied prior art references of record, alone or in combination, fail to teach or suggest the recited features of new claim 50. The Office Action relied on Haartsen, Montano, Chuah and Le to reject previous claims 32-49.

By way of review, Haartsen is directed towards a system and method for providing “peer-to-peer, ad-hoc communications in which access to the communication channel is regulated by a

pseudo-token access scheme,” and discloses that a communication unit to which a pseudo-token is assigned transmits data packets on a reserved timeslot as a contention resolution scheme. (Haartsen, paragraph [0011]). Furthermore, Haartsen discloses that a master communication unit assigns a reserved time slot to each of slave communication units based on a priority level. (Haartsen, paragraphs [0014], [0015], [0051], abstract).

Montano is directed towards a “device and method to join an existing wireless network without colliding with other device[s]” and discloses that there may be multiple non-coordinators within a usable area of a coordinator, and management time slots can be shared among the multiple non-coordinators. (Montano, col. 2, lines 50-67, col. 3, ll. 55-57, col. 15 line 65- col. 16, line 6).

Chuah is directed towards an “on-demand multiple access (ODMA) method with a fair queueing (FQ) service discipline (referred to as ODMAFQ) for efficient utilization of the limited bandwidth available in wireless communications networks” and discloses that, in order to assign different priorities to remote nodes, M1 minislots may be divided into various groups. Specifically, Chuah discloses that minislots are divided into various groups so that a group of remote nodes with MAC addresses within a certain range may only be allowed to randomly access up to M2 minislots (where $M2 < M1$), whereas a higher priority group of remote nodes with MAC addresses within another range may be allowed to randomly access up to M1 minislots for providing groups, such as emergency-response organizations, with a higher priority of access. (Chuah, paragraph [0092]).

Le is directed towards a “system and method for increasing bandwidth usage between an access point and a wireless device” and discloses that a priority factor is determined based upon an amount of data packet uploaded by a wireless device to an access point, a priority wireless

device is identified by comparing priority factors of wireless devices, and unallocated transmission slots are allocated to the priority wireless device. (Le, claim 6, paragraph [0009], [0023]).

In contrast to each of these four references, new claim 50 is directed towards a method of contention resolution processing between at least two radio communication devices and recites the technical features of a “radio communication device” comprising:

“a detection section that detects an operation of the other radio communication device during a time slot, the time slot being used at a high priority by the radio communication device, within the communication area of the radio communication device; and

a contention resolution section that performs contention resolution processing when the detection section detects an overlap based on the other communication device operating during the time slot, said contention resolution section comprising:

a time slot dividing section that divides the time slot into a plurality of slots, and

a slot setting section that sets one of the plurality of divided slots to the radio communication device as a higher priority slot, and sets another of the plurality of divided slots to the other radio communication device as a lower priority slot (emphasis added).”

The radio communication device recited by claim 50 includes the idea of, upon detecting a contention of a time slot, a radio communication device divides its own time slot in use by the radio communication device at a high priority via the time slot dividing section, in order for part of the time slot to be used by another radio communication device. By doing so, aspects of the present invention provide a flexible mechanism which enables radio communication devices to “share the wireless medium equally with the other HCs [radio communication devices] detected,” even during the detection of a contention among the radio communication devices.

None of Haartsen, Montano, Chuah and Le, teaches or suggests the time slot dividing section and slot setting section recited by claim 50.

In the previous rejection, the Office Action acknowledged that neither Haartsen nor Montano disclosed these features, but argued that “Chuah teaches, that the given radio communication device divides the overlapped time slot (contention reservation slot) into a plurality of time slots (pg. 7, pp0092).” Paragraph [0092] of Chuah states:

“In order to assign different priorities to the remote nodes attempting to gain access to the system, the $M_1 = N_1 * k$ minislots (where N_1 is the number of contention reservation slots) may be divided into various groups. For example, a group of remote nodes with MAC addresses within a certain range may only be allowed to randomly access up to M_2 minislots (where $M_2 < M_1$), whereas a higher priority group of remote nodes with MAC addresses within another range may be allowed to randomly access up to M_1 minislots. (emphasis added)”

Thus, Chuah discloses that minislots are divided into various groups, and that these groups may consist of different remote nodes with different MAC addresses.

However, Chuah does not disclose that the minislots are divided by “a time slot dividing section” included in a radio communication apparatus, recited by claim 50. Instead, Chuah discloses that “end systems (remote hosts)” connect to “base stations (access points) 236” which provide wide-area wireless coverage to the end systems. Chuah, par. [0047]; see also FIG. 2. The remote hosts of Chuah are not described as the entities that “divide” the minislots into various groups or perform any other functions to control access to the system. In contrast, the base station “schedules transmission of its uplink and downlink traffic and allocates bandwidth dynamically, based on traffic characteristics and QoS requirements as well as the current bandwidth needs of all supported hosts.” Chuah, par. [0080]. Furthermore, the base station “uses a variant of the Self-Clocked Fair Queueing algorithm of Golestani for scheduling the order of packet transmission from both remote hosts (remote queues) and wired hosts (local

queues).” Chuah, par. [0077]. Since the base station of Chuah “schedule[s] the order of packet transmission” and “allocates bandwidth dynamically,” the base station (not the remote hosts) is also very likely the entity that divides the minislots into various groups and thereafter “assign[s] different priorities to the remote nodes attempting to gain access to the system” based on MAC addresses of the remote hosts, which is useful, for example, during emergency communications. Since the base station of Chuah is not the same as the radio communication apparatus recited by Applicants' claim 50 (the base station does not use a time slot at a “high priority” and then divide its own time slot upon detecting a contention), Chuah fails to teach or suggest a radio communication apparatus which divides its own time slot, as recited by Applicants' claim 50.

Accordingly, since Chuah fails to teach or suggest a radio communication apparatus including “a time slot dividing section,” and since none of the other references cure this deficiency of Chuah, it is respectfully submitted that instant claim 50 is patentable for at least this reason.

Moreover, one skilled in the art at the time of the present invention would not have been motivated to combine the prior art references to arrive at the invention recited by claim 50, and in fact, Haartsen, Montano, Chuah and Le likely cannot even be reasonably combined. Haartsen discloses a contention resolution scheme where the right to transmit on the communication channel is assigned in the form of a “pseudo-token,” and access to the communication channel is granted by a pseudo-token. That is, only a communication unit which possesses a pseudo-token can access the communication channel. As the Office Action sets forth at page 5, lines 2-9, Haartsen fails to teach the previously recited feature of “dividing a communication period.” The reason why Haartsen fails to teach “dividing a communication period” is because, in the system of Haartsen, contention never occurs in the first place because Haartsen controls access to a

reserved time slot using a pseudo-token. Therefore, the features of “...during a time slot, the time slot being used at a high priority by the radio communication device...” and “...when the detection section detects an overlap based on the other communication device operating during the time slot...”, as recited by Applicants' claim 50, could never occur in the system which is assumed by Haartsen.

Moreover, since Montano and Chuah make general references to division of time, one skilled in the art would not have been modified to modify the system of Haartsen with Montano and Chuah because Haartsen teaches away from Montano and Chuah. “A prior art reference that ‘teaches away’ from the claimed invention is a significant factor to be considered in determining obviousness.” MPEP 2145 (X)(D)(1). Here, if Haartsen was modified to divide its disclosed reserve time slot, the reserved time slot (which is granted by a pseudo-token) would be merely divided into plural time slots, and the plural time slots which are derived from the reserved time slot will never be assigned to another communication unit which does not possess the pseudo-token. Therefore, Haartsen teaches away from Montano and Chuah because content resolution has been already achieved due to a pseudo-token. Accordingly, one skilled in the art would not have been motivated to combine Haartsen with Montano and Chuah to arrive at numerous features recited by Applicants' claim 50, including, for example, the “time slot dividing section” and “slot setting section” recited by claim 50.

Therefore it is improper to combine Haartsen, Montano and Chuah. See, e.g., In re Grasselli, 713 F.2d 218 USPQ (Fed. Cir 1983), and claim 50 is patentable for at least this reason as well.

Newly added claims 51-59 depend on claim 50. Accordingly, it is respectfully submitted that newly added claims 51-59 are patentable for at least the same reasons claim 50 is patentable.

Claim 60 recites the features of “wherein the radio communication device divides the time slot into a plurality of slots, has priority use of one of the plurality of divided slots in the time slot as a higher priority slot, and sets another of the plurality of divided slots to the other radio communication device as a lower priority slot.” Accordingly, it is respectfully submitted that claim 60 is patentable for at least the same reasons that claim 50 is patentable.

In view of the above, it is submitted that this application is in condition for allowance, and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a personal communication, the Examiner is requested to e-mail the undersigned at the address listed below.

Respectfully submitted,

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